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# PHASMID STUDIES

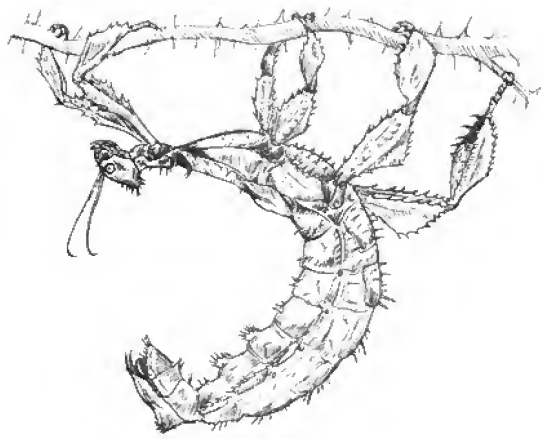
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Editor: Dr. P.E. Bragg.



## The Phasmid Study Group.

The Phasmid Study Group (PSG) was formed in 1980 to foster the study of phasmids. The group currently has several hundred members worldwide. The membership ranges from young children to professional entomologists. The PSG holds regular meetings and presents displays at all the major entomological exhibitions in the U.K. The PSG places emphasis on study by rearing and captive breeding and has a panel of breeders who distribute livestock to other members. The PSG produces two publications which are issued free to members.



*The Phasmid Study Group Newsletter* is issued quarterly and contains news items, livestock information, details of exhibitions and meetings, and a variety of short articles on all aspects of phasmids.

*Phasmid Studies* is issued on-line and in print. Typically it is produced biannually, in March and September. It contains longer articles on all aspects of phasmids, with an emphasis on natural history, captive breeding, taxonomy, and behavioural studies. Each issue contains abstracts of papers from other recent publications.

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1. Articles are welcome from anyone and the editor is prepared to offer advice and help to contributors. The editor would like to encourage people with no previous experience to write articles for *Phasmid Studies*.
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1. The title should be followed by the author(s) name and address, an abstract, a list of key words, an introduction (if necessary), the main article, and finally a list of references.
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4. All titles and headings should be in bold print and not underlined. The main title and all side-headings should be aligned on the left hand side of the page. If the article is lengthy major headings may be created by using centred headings in bold print.
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9. Numbers between one and ten should be spelled out while numerals should be used for 11 and above; the exceptions to this are where measurements are involved, or in descriptions of insects, in both cases numerals may be used throughout.
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17. If the word processor used does not have a table facility then tables of measurements etc. should be laid out using tab settings (not character spaces).

# Phasmid Studies

Volume 14, numbers 1 & 2.

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# **A review of *Paraloxopsis* Günther, 1932 and a first description of the male and egg of *Paraloxopsis korystes* Günther, 1932.**

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## **Abstract**

The genus *Paraloxopsis* Günther, 1932 was described from a single female specimen of *Paraloxopsis korystes* Günther, 1932. The male and egg are described for the first time, along with a redescription, and illustrations, of the female; three new Bornean localities are recorded for this species. *Loxopsis tuberculata* Redtenbacher, 1908 is transferred to *Paraloxopsis*, redescribed, and recorded from five new localities. The key features distinguishing this genus from *Loxopsis* Westwood, 1859 are listed. The mode of egg laying is discussed in relation to other possible related genera.

## **Key words**

Phasmida, , Necrosciinae, *Paraloxopsis*, Borneo, Brunei, Kalimantan, Sabah, Sarawak.

## **Introduction**

The genus *Paraloxopsis* Günther, 1932 was described from a single female specimen of *Paraloxopsis korystes* Günther, 1932, which was collected on Mt. Kinabalu, Sabah. Two specimens, one male and one female with eggs, of *Paraloxopsis korystes* Günther, 1932 were located in the collection of C.L. Chan (Kota Kinabalu, Sabah); these were borrowed in order to confirm their identity by direct comparison with the type specimen in Hamburg Museum (ZMUH). Recently two males were sent to me for identification by a PhD student, Ed Turner, at Cambridge University (CUMZ).

In 1993 I received, from Mel Herbert, a photograph of a phasmid collected near Badas in Brunei, along with a note about the eggs. In 1994, accompanied by Mel Herbert and Ian Abercrombie, I collected a female of the same species in an area of drained swamp forest near Badas. The specimen laid five eggs before dying; the egg was illustrated and described as "*Loxopsis* sp." (Bragg, 2001: 565, figs 225a-c). Recent examination has shown the insect belongs in *Paraloxopsis* and the species was originally described as *Loxopsis tuberculata* Redtenbacher, 1908; the material has been compared with a photograph of the type material in Paris Museum (MNHN). Eight more specimens of this species have been located in other collections: Cambridge University Museum (CUMZ), Sarawak Museum (SMSM), Kinabalu Park Conservation Centre, and in the private collection of Francis Seow-Choen in Singapore. In some cases the examination of material was restricted to photographic examination only.

Standard museum codens (Arnett, *et al*, 1993; <http://hbs.bishopmuseum.org/codens/>) are used below, in addition: PEB indicates a specimen in my personal collection; Kinabalu NP indicates material in Kinabalu National Park Conservation Centre, Sabah; C.L. Chan's collection is in Kota Kinabalu, Sabah.

## ***Paraloxopsis* Günther, 1932**

*Paraloxopsis* Günther, 1932: 317; Bragg, 2001: 592.

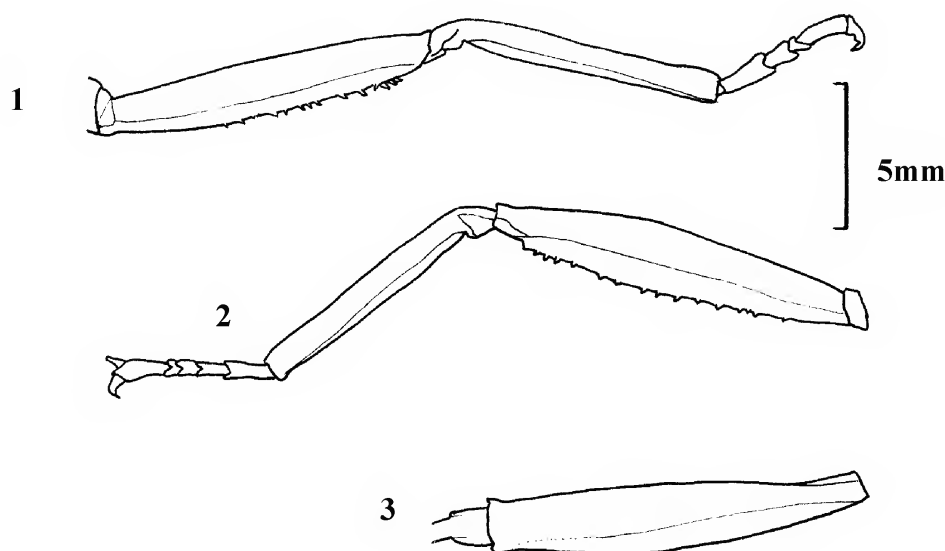
Type species *Paraloxopsis korystes* Günther, 1932, by original designation.

## **Description of the genus**

Body quite robust. Head, thorax, and legs densely granulose. Whole insect uniformly mid brown, or mid brown with cream, greenish-grey or dark brown patches particularly on the legs and costal region of the wings. Head approximately triangular in both lateral and dorsal aspects. Back of the head with an elongated swelling that narrows to a point and projects backwards over the pronotum; head spinose, and may be lobed. Antennae projecting slightly beyond the apices of the forelegs; segments distinct, but less so towards the apex. Mesonotum spinose; female with one or two obvious swellings, with at least the anterior spinose. Tegmina with a very distinct hump. Wings reaching to about the end of 7<sup>th</sup> abdominal segment. Anal region of wings translucent, with brown veins. Ventrally all femora have a double row of spines at least apically.

Hind legs not reaching the end of the abdomen, or reaching only slightly beyond. Hind femora distinctly swollen. All legs with basal tarsomere less than twice the length of second tarsomere. Operculum of female with a deep apical incision. Anal segment of female with apex straight, male with an apical notch. Cerci cylindrical. The eggs are almost spherical but have a polar spine that is used to pin them to leaves.

**Comments:** Generally very similar to *Loxopsis* Westwood, 1859, but distinguished by the pointed elongation of the head and by the swollen hind femora; *Loxopsis* have a conical head (but not pointed), and the hind femora are not swollen. Eggs similar in general form to those of *Asceles*. The genus appears to be endemic to Borneo.



**Figures 1-3.** Hind legs of female *Paraloxopsis tuberculata* (specimen PEB-2300).

**1.** Anterior view of left hind leg; the tarsus is four-segmented indicating the leg has been regenerated, the femur is less swollen than is normal in this genus. **2.** Anterior view of right hind leg; the femur showing the normal degree of swelling. **3.** Dorsal view of right femur.

### Key to species

1. Body and costal region of wings more or less uniformly mid-brown or brown with only one or two broad dark bands, or with some grey bands. Head granulose and spinose, but without lobes. When the insect is viewed laterally the front edge of the tegmina are not concave. Mesonotum of female with two obvious mounds which are evenly spaced on the segment; mesonotum of male spinose mainly at the anterior.  
..... *Paraloxopsis tuberculata* (Redtenbacher)
- Body and costal region of wings mid brown with lighter (cream) and darker markings. Head with lobes in addition to granules. When viewed laterally, with the wings folded, the tegmina have a concave front edge. Mesonotum of female with one spinose mound at the mid point, the second mound is spineless and on the posterior margin; male with a bispinose mound at the mid point.  
..... *Paraloxopsis korystes* Günther

***Paraloxopsis korystes* Günther, 1932**

*Paraloxopsis korystes* Günther, 1932b: 318, fig. 1 (♀); Bragg, 2001: 593; Zompro, 2002: 191.

Holotype ♀ (ZMUH) Sabah, Mt Kinabalu, c. 1500m, coll. Waterstradt.

**Material examined**

SABAH, Mt Kinabalu, c. 1500m.

Holotype ♀ (ZMUH) coll. Waterstradt.

SABAH, Sepilok Forest Reserve, Orang-utan Research Centre.

♀ & 5 eggs (C.L. Chan) Chan, Wong & Seow, 17.iv.1993.

SABAH, Maliau Basin, Gunung Lotung, 500m.

♂ (C.L. Chan) 18-20.iv.1988, W. Wong.

SABAH, Danum Valley, Primary forest. Fogging experiment, sample: 2 East.

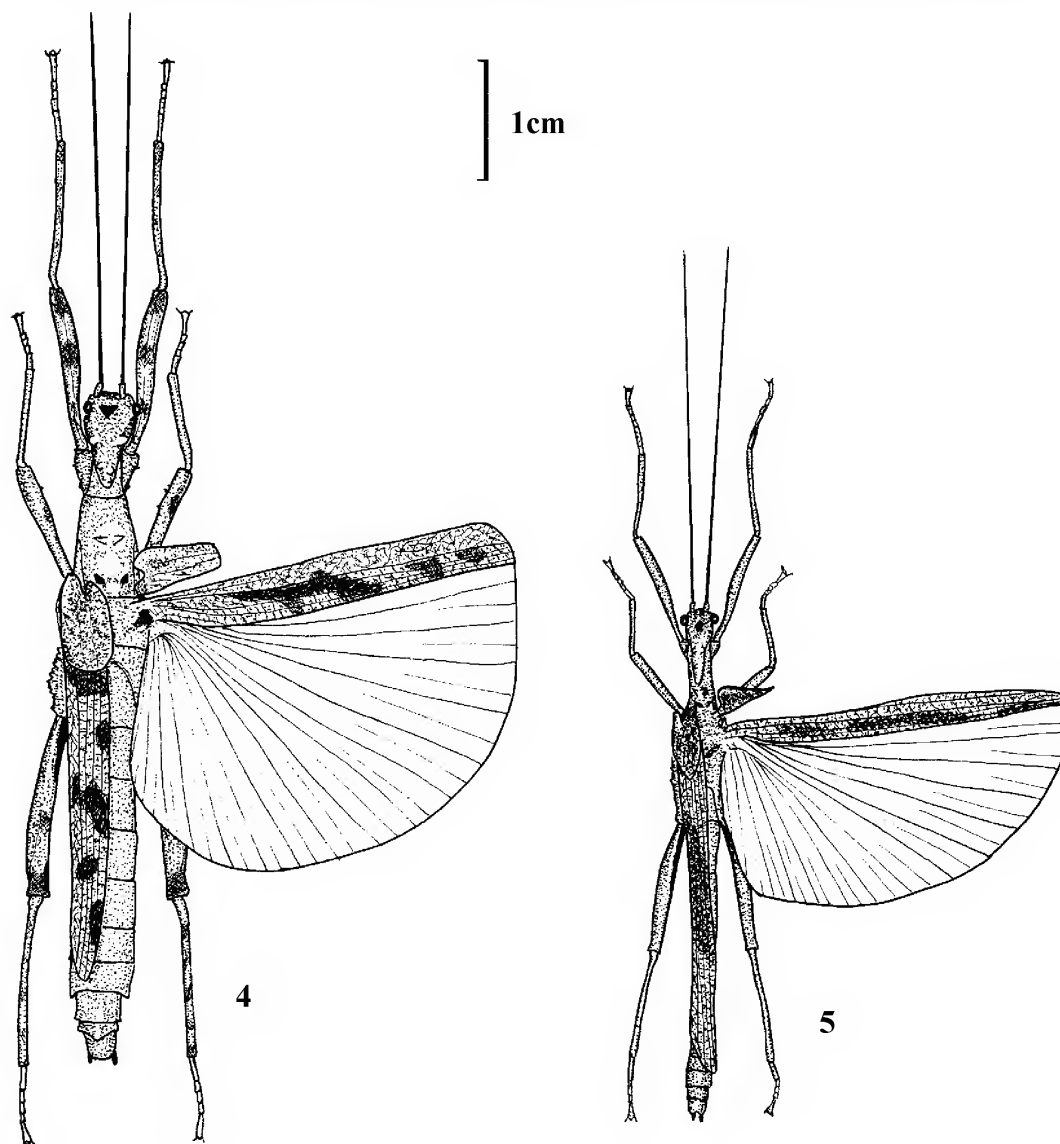
1♂ (CUMZ) Ed Turner, 2002.

SABAH, Danum Valley, Primary forest. Fogging experiment, sample: J East.

1♂ nymph (CUMZ) Ed Turner, 2002.

SARAWAK, Lambir Hills N.P.

1 nymph (Photograph only - specimen not preserved) Robert Junker, 03.iii.2006.



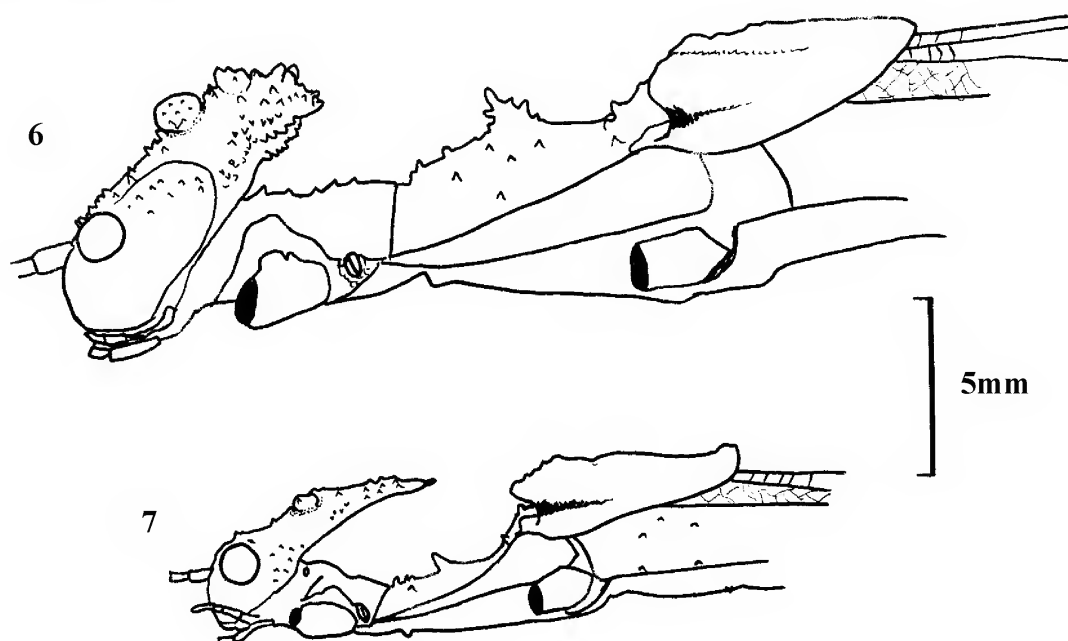
**Figures 4-5.** *Paraloxopsis korystes*. 4. Female. 5. Male.

**Female** (figs 4, 6, 8-10)

The following description and the measurements in table 1 are based on C.L. Chan's material only. The spines in the middle of the mesonotum are simple on the holotype, and compound on Chan's specimen. The body length of both females is 56mm; full measurements of Chan's specimen are given in table 1.

Head, body and legs mid brown, indistinctly mottled with dark brown; fore and hind femora have a dark band at the apex, abdominal tergites 7-10 are predominantly dark brown; many of the spines have dark apices. The head has a clearly defined dark brown triangle between the eyes and there are two triangles of the same colour on the posterior of the mesonotum. The posterior half of the mesonotum has a smooth patch (devoid of granules) of medium to dark brown. Tegmina and costal region of wings are mottled mid brown, dark brown and a sandy-cream colour; there is no distinct pattern to the coloration, for example the left tegmen bears all three colours while the right tegmen is almost uniformly sandy-cream. Anal region of wings translucent, colourless, with brown veins.

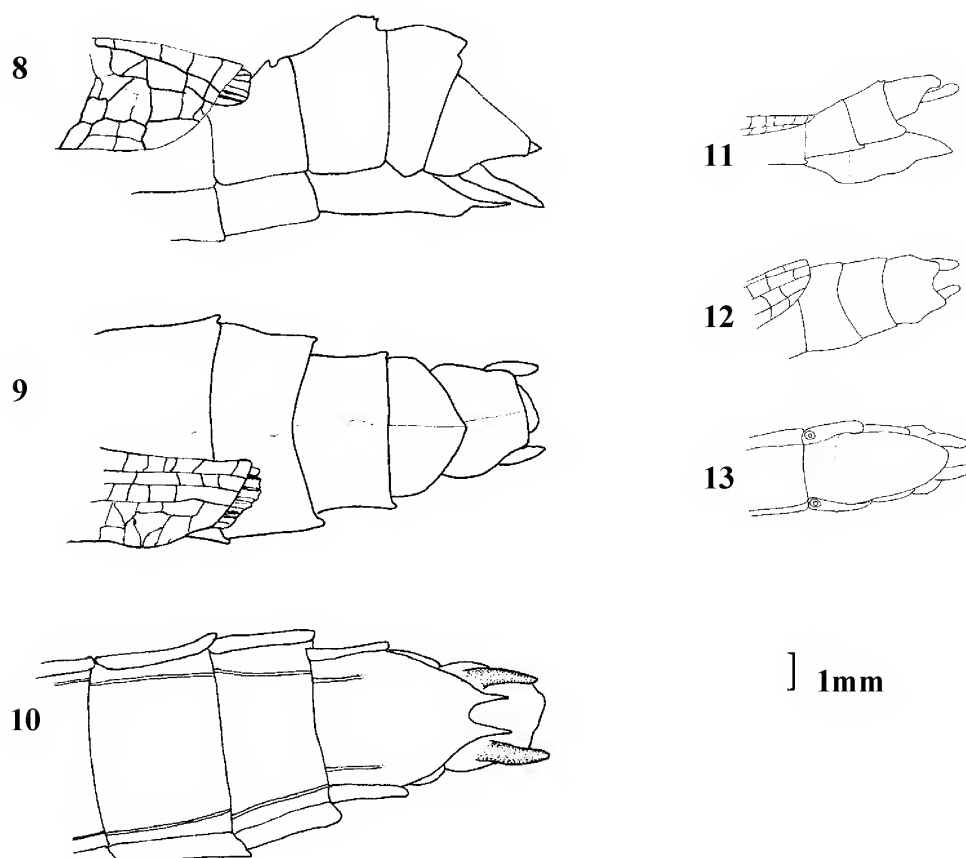
Back of the head finely spinose and lobed, lobes are on the elongated swelling at the back of the head; the swelling projects backwards, reaching just beyond the mid point of the pronotum and has a distinct downwards curve (fig 6). Pronotum granulose; suddenly narrowing just behind the anterior margin then gradually widening, anterior and posterior margins about equal width. Mesonotum spinose and granulose; mid point with a swollen mound which bears two compound spines (holotype has two simple spines); posterior margin with a granulose swelling; the area between the two swellings is smooth. Metanotum and abdominal tergites more or less smooth, tergites 6-10 slightly rugulose laterally. Abdominal tergites 6-9 with small lobe on posterior margin, 8-9 are slightly laterally compressed and strongly raised. Anal segment with slight longitudinal carina; apex straight. Cerci visible dorsally, cylindrical. Apex of operculum with such a deep notch that it almost appears to terminate as two spines (fig 10). Pro and mesopleura granulose, metapleura granulose and spinose. Thoracic sternites granulose; abdominal sternites smooth or setulose.



**Figures 6-7.** *Paraloxxopsis korystes*, head and thorax, side view. 6. Female. 7. Male.



Tegmina rugose, leading edge (when folded) very distinctly concave (fig 6). All legs granulose throughout, each with tibiae only slightly shorter than femora. Fore femora compressed and incurving at the base, outward curving at the apex. Hind femora swollen and with a twisted appearance. Hind tibiae reaching to the apex of the abdomen. All femora with indistinct medio-ventral carina at the base, this becomes more distinct and divides into two parallel carinae towards the apex. Medio-ventral carinae spinose apically on fore femora, spinose throughout on mid and hind femora. Hind femur with medio-ventral carina very close to ventro-posterior carina, particularly basally.



**Figures 8-13.** *Paraloxopsis korystes* abdomens: lateral, dorsal, and ventral views.

**8-10.** Female. **11-13.** Male.

**Male** (figs. 5, 7, 11-13)

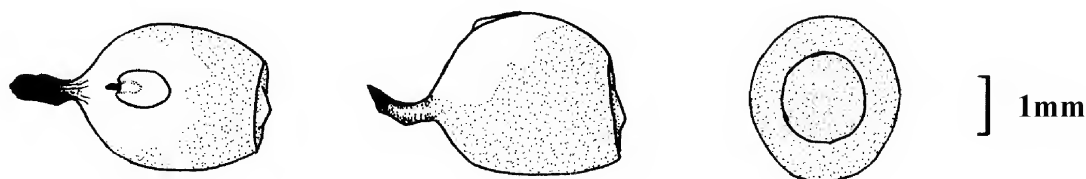
Coloration similar to female but with less sandy-cream present; brown triangles on head and mesonotum less distinct. Body length 43.5-44mm, full measurements of C.L. Chan's specimen are given in table 1; CUMZ nymph 21mm.

Head and pronotum as in female. Mesonotum as in female but median mound has only two simple spines. Abdominal tergites without lobes, otherwise as in female; anal segment with slight longitudinal carina, apex of segment with a rounded notch (fig 12). Thoracic and abdominal sternites, and pleura as in female. Poculum semi-cylindrical, narrowing at the apex to terminate in a blunt triangle (fig 13).

Tegmina as in female. Legs as in female but outward curve of fore femora is almost imperceptible; hind tibiae not quite reaching end of abdomen but tarsi exceeding it; spination and carinae of femora as in female.

### Eggs (figs. 14-16)

Capsule almost spherical with ventral side and opercular end flattened, polar end with long, slender stalk; ventral side slightly longer than dorsal. Capsule mid brown antero-dorsally and dark-brown posterior-ventrally and around the operculum. Operculum dark brown, round; with a small, central, conical mound. Micropylar plate white with a red margin, small, oval with a indentation at the polar end, slightly raised. Length (excluding stalk) 3.4mm, height 2.8mm, width 2.6mm, stalk length 1.1mm.



**Figures 14-16.** Egg of *Paraloxxopsis korystes*; **14.** dorsal, **15.** lateral, **16.** opercular view.

### *Paraloxxopsis tuberculata* (Redtenbacher, 1908) n. comb.

*Loxxopsis tuberculata* Redtenbacher, 1908: 503; Bragg, 2001: 565. Syntypes: ♀ (MNHN) Kalimantan, Pontianak. R. Oberthur, 1897; ♂ (MNHN – not traced) Borneo.

*Agondasoidea tuberculata*; Seow-Choen, 1998: 9, fig (♀).

*Loxxopsis* sp.; Bragg, 2001: 565, figs 225a-c (egg).

[Not *Loxxopsis tuberculata* Klante, 1969: 5, fig 1(♂); Klante, 1975: 93. – misidentification.]

### Material examined

BRUNEI, Badas.

♀, with 5 eggs (PEB-2300) 01.xi.1994, P.E. Bragg. ♀ (Photograph only – see cover illustration of this publication) 06.iii.1993, Mel Herbert.

KALIMANTAN, Pontianak.

♀ Syntype (MNHN) R. Oberthur, 1897 [photograph only examined].

SABAH, Long Pasia, 900m.

♀ (Kinabalu NP – PH/97/00103) 27.vi.1997, Puis K.

SARAWAK, Serapi.

♀, ♂ (F. Seow-Choen) v.1997, FSC.

SARAWAK, Serapi N.P.

2♂♂, (F. Seow-Choen) xii.1997, FSC.

SARAWAK, Kuching.

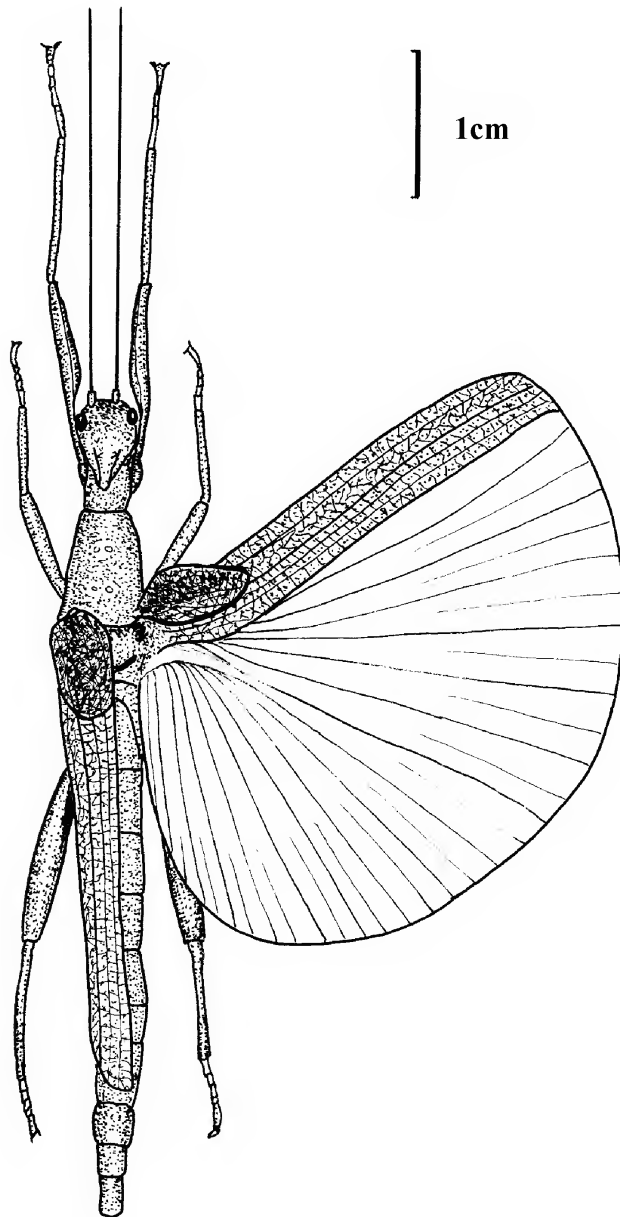
♀ (CUMZ) 20.viii.1897; ♀ (SMSM-365) 30.v.1900 [photograph examined].

SARAWAK, Santubong.

♀ (SMSM-366) vii.1925 [photograph examined].

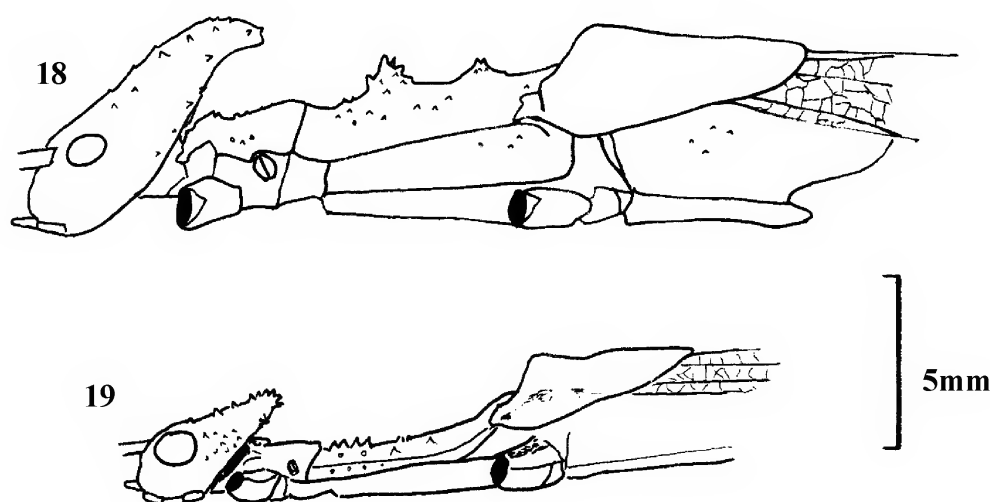
### Female (figs 1-3, 17-18, 20-22)

Head, legs and body almost uniformly mid brown, but may be mottled with slightly darker brown. Costal region of wing mid brown with one or two dark brown blotches; rarely, the costal region is uniformly mid brown (PEB-2300 is the only one of eight specimens). The dark blotches vary in shape and may be symmetrical or different on the two wings. Anal region of wings translucent pale brown with brown veins. Body length 54-56mm, full measurements in table 1.



**Figure 17.**  
*Paraloxopsis tuberculata*, female.

Back of the head spinose but without lobes; the swelling projects backwards, reaching well beyond the mid point of the pronotum, almost to the posterior, and has a distinct downward curve (fig 18). Pronotum granulose; suddenly narrowing just behind the anterior margin then gradually widening, anterior and posterior margins about equal width. Mesonotum roughly granulose; with two swollen mounds, the first is one third from the anterior margin and is bifurcate and bears a few rounded spines, the second is one third from the posterior margin and is bifurcate and granulose but not spinose; posterior margin with a minute granulose swelling. Metanotum and abdominal tergites smooth. Abdominal tergites 8-9 slightly laterally compressed and strongly raised, with a small lobe on the posterior margin. Anal segment with slight longitudinal carina; apex straight or very slightly indented. Cerci cylindrical; visible dorsally only on the specimen with a shrunken abdomen (CUMZ). Apex of operculum with a deep notch (fig 22). Pro-, meso-, and metapleura granulose. Thoracic sternites granulose; abdominal sternites smooth or setulose.



**Figures 18-19.** *Paraloxxopsis tuberculata*, head and thorax: **18.** Female. **19.** Male.

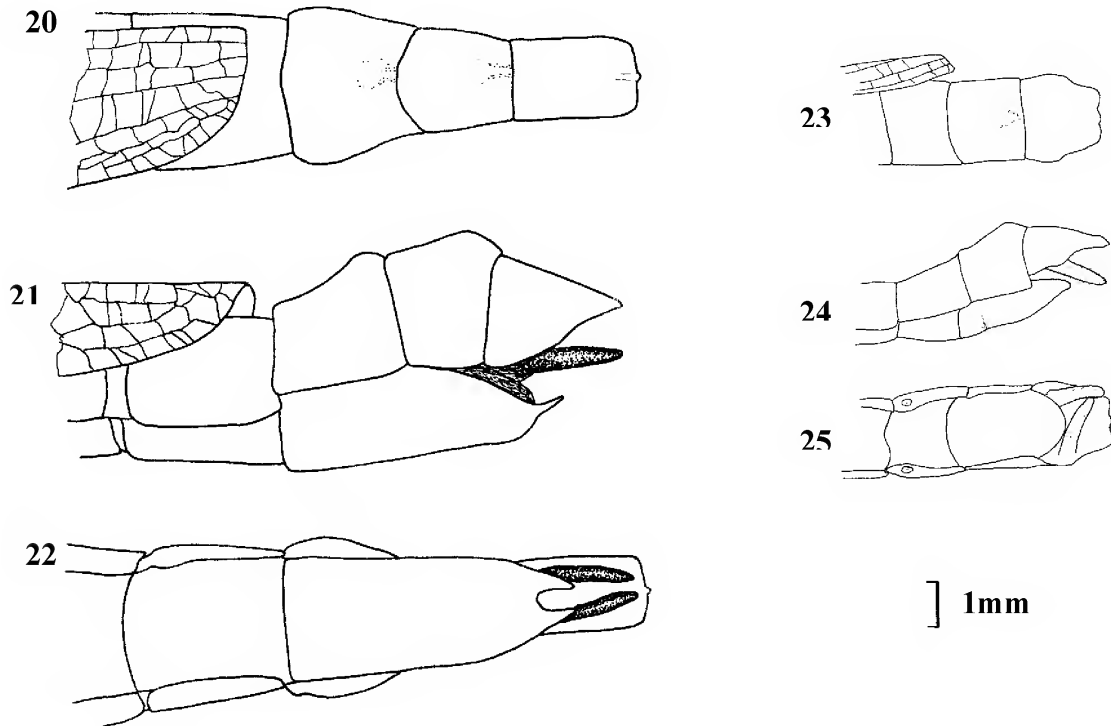
Tegmina rugose, leading edge (when folded) is almost straight (fig 18). All legs granulose throughout, with tibiae slightly shorter than femora. Fore femora compressed and incurving at the base. All femora appear swollen, particularly the fore and hind femora. Hind legs seem to be of variable length compared to the body length: the two specimens from Badas have legs that do not reach the end of the abdomen, the KNP and Seow-Choen's specimens have legs which reach beyond the end of the abdomen: the other specimens are damaged or it is not possible to judge the leg length from the photographs. All femora with indistinct medio-ventral carina at the base, this becomes more distinct and divides into two parallel carinae towards the apex. Medio-ventral carina spinose only apically on fore femora, spinose throughout most of mid and all of hind femur. Hind femur with medio-ventral carina very close to ventro-posterior carina basally.

#### **Male** (figs 19, 23-25)

Coloration more variable than female; one specimen mainly mid brown mottled with darker brown and some sandy-cream; two specimens with lighter bodies mottled with mid and dark brown, heads uniformly sandy-cream. Body length 42-44mm; full measurements are given in table 1. Tegmina and costal region of wing darkish brown with numerous greenish-grey blotches.

Back of head spinose and without lobes; swelling reaching no more than half way along the pronotum at most, and not downward curving (fig 19). Pronotum as in female. Mesonotum granulose, with a few enlarged granules or small spines on the anterior; there are no mounds in the middle, only a minute swelling between the bases of the tegmina. Abdominal tergites 1-6 smooth, 7-10 rugulose, 9<sup>th</sup> with small lobe on posterior margin, anal segment slightly granulose, apex of segment slightly indented (fig 23). Thoracic and abdominal sternites and pleura as in female. Poculum semi-cylindrical, apex rounded (fig 25).

Tegmina as in female. Legs similar to female; distortion of the abdomens makes relative length of back legs difficult to judge; spination and carinae of femora as in female.

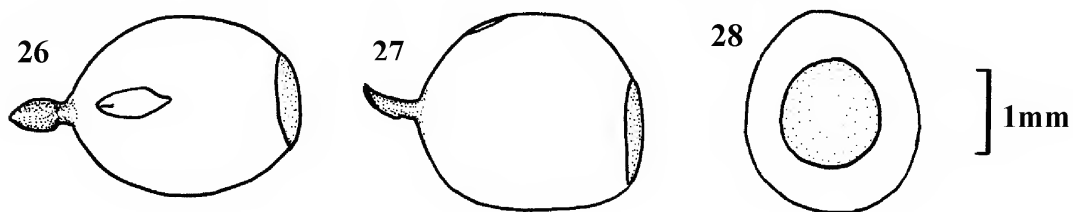


**Figures 20-25.** *Paraloxopsis tuberculata*, abdomens: lateral, dorsal, and ventral views.  
20-22. Female. 23-25. Male.

#### Eggs (figs 26-28).

Capsule almost spherical with opercular end flattened, polar end with long, slender stalk. Capsule very pale brown with mid-brown blotches around operculum and micropylar plate. Micropylar plate small, diamond shaped, slightly raised. Length (excluding stalk) 2.7mm, height 2.5mm, width 2.2mm, stalk length 0.7mm.

A group of five eggs was laid on one leaf by PEB-2300.



**Figures 26-28.** Egg of *Paraloxopsis tuberculata*; 26. dorsal, 27. lateral, 28. opercular view.

#### Comments

The CUMZ specimen bears a label (in Shelford's handwriting?) that reads "*Acridiopus* n.sp. n.g. near *Agondasoidea* Brunner". Mel Herbert (personal communication), also reported finding a male, presumably of this species, at Badas in February 1993, but the specimen was not photographed or preserved. Klante's specimen was labelled as being from the Philippines, although he expressed doubts about this, and his illustration clearly shows that it has a mesothorax about twice as long (compared with the fore wing) as the species illustrated here, it is therefore unlikely that Klante's specimen was *tuberculata*.

Lengths in mm.	<i>P. korystes</i>		<i>P. tuberculata</i>	
	♀	♂	♀	♂
Body length	56	44	(54-)56	42-44
Antennae	33	30	30	23
Head	7	6	7	4
Pronotum	4	2.5	4.5	2.5
Mesonotum	8.5	4.5	8(-7.5)	5.5
Metanotum	6	6	5	?
Median segment	8	3	5	?
Tegmen	8	6	8	5.5
Hind wing	32	30.5	31.5	28.5
Fore femur	14	10	12	11
Fore tibia	13.5	4.5	9.5(-10.5)	6
Fore tarsus	7.5	6	7	6
Mid femur	10	8	8	7
Mid tibia	4.5	7.5	6.5	5
Mid tarsus	5.5	4	4.5	4
Hind femur	16	11	11.5(-13)	11.5
Hind tibia	15	10	9.5(-10)	8
Hind tarsus	8	6	5.5(-6)	5

**Table 1. Measurements of *Paraloxopsis* spp.**

The measurements in the table are based only on my specimen and those of Francis Seow-Choen, measurements were not taken from photographs, the KNP specimen was not measured at the time of examination; the CUMZ female was omitted since it clearly has a shrunken abdomen, originally it would have been of similar size to the other specimens. The table gives the longest and shortest body length for each sex, and full measurements of the longest specimens; the figures for the female in brackets are for Seow-Choen's specimen, which has relatively longer fore and hind legs.

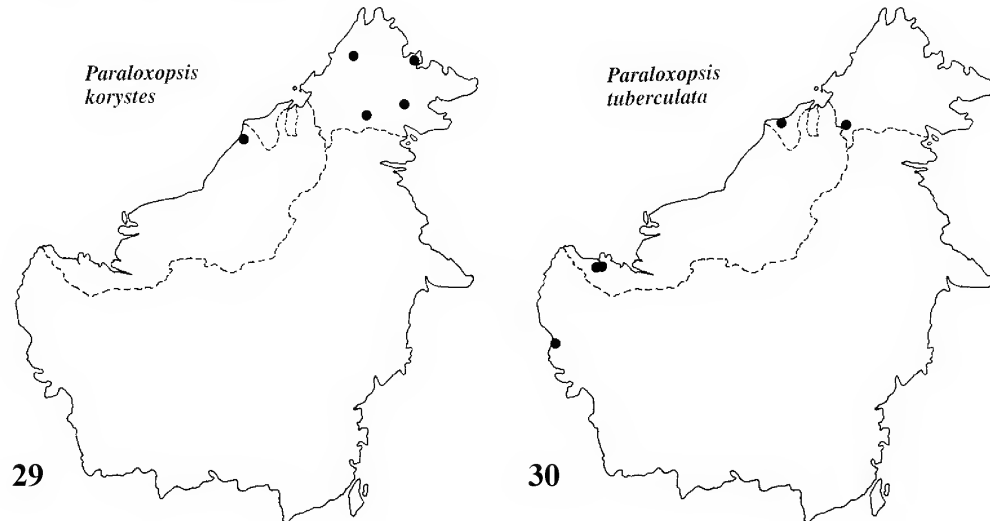
## Discussion

The eggs of the two species in this genus are highly specialised, as are those of several species of *Asceles* (e.g. *inquinatus* Redtenbacher, *larunda* (Westwood), *margaritatus* Redtenbacher, *malaccaae* (Saussure), *moricula* (Redtenbacher), *tanarata* Brock, *singapura* Brock & Seow-Choen, and an unidentified Bornean species in my collection). The eggs (figs 14-16 & 26-28) are pinned to leaves by the polar spine (see Sellick, 1993, figure 1). The females of both genera have a deeply notched operculum. Such an unusual method of egg laying is unlikely to have developed independently and must be considered as evidence for a close relationship between the genera exhibiting this characteristic.

On the basis of adult morphology, *Loxopsis* and *Paraloxopsis* must be very closely related. I have found eggs similar to those of *Paraloxopsis* in an area of Kalimantan where I collected two males of *Loxopsis*. Since *Loxopsis* are usually comparatively rare in Borneo,

finding two in one area suggests they were common at that locality, in addition the area had few phasmid species present, so the chance that the eggs are from *Loxopsis* is correspondingly high. This suggests the eggs of the two genera are also very similar.

*Paraloxopsis tuberculata* has quite a wide distribution (see fig 30) while *korystes* appears more restricted (fig 29). At least three of the specimens of *tuberculata* were collected in an area of peat swamp, as were two of four Bornean members of *Loxopsis* in my collection. The mode of egg laying is particularly suited for peat swamps where eggs dropped to the ground would be in danger of becoming water-logged.



**Figures 29-30.** Distribution of *Paraloxopsis* spp. in Borneo.

### Acknowledgements

I am grateful to Oliver Zompro for providing the photograph of the type specimen of *Loxopsis tuberculata*; to Mel Herbert, and Robert Junker for their photographs. Thanks are due to C.L. Chan, F. Seow-Choen, and staff at CUMZ for the loan of material. My thanks to staff at ZMUH for granting access to the collection. Charles Leh of SMSM kindly allowed me to photograph the collection several years ago when I was cataloguing the collection. Lastly, thanks to staff at Kinabalu Park Conservation Centre for permission to photograph specimens during my visit in 2001.

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## A new subgenus of *Orthomeria* Kirby, 1904 and a new species from Danum Valley, Sabah.

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### Abstract

A new subgenus *Orthomeria* (*Parorthomeria*) is established with *Orthomeria* (*Parorthomeria*) *alexis* (Westwood, 1859) as the type species. *Orthomeria* (*Parorthomeria*) *turneri* n.sp. is described from a male and female collected at Danum Valley, Sabah, one specimen from the Baram river region of Sarawak, and from two specimens previously recorded by the author as variations of *O. alexis*. The new species is closely related to *alexis*.

### Keywords

Phasmida, *Parorthomeria* new subgenus, *Orthomeria* (*Parorthomeria*) *turneri* new species, *Orthomeria alexis*, Danum Valley, Sabah, Borneo.

### Introduction

In 2005 I received some specimens of Phasmida for identification. The material was collected by canopy fogging and from leaf-litter samples by Dr. Ed Turner (Cambridge University), and stored in alcohol. Several species were readily identifiable while still in tubes of alcohol, and a pair of *Orthomeria* were provisionally identified as *O. alexis* (Westwood, 1859). When the specimens had been removed from alcohol, set, and dried, the *Orthomeria* were found to be rather small when compared to the measurements in *Phasmids of Borneo* (Bragg, 2001: 304, table 29). On closer examination they were found to be a new species. The similarity to *alexis* led to a re-examination of two females listed as “*Orthomeria alexis*–variation” (Bragg, 2001: 309), although larger than the specimens from Danum, these are the same as the new species. A fifth specimen was subsequently located in the Natural History Museum, London. All type specimens of *alexis* have been examined, and a lectotype is designated.

The following codens are used: BMNH the Natural History Museum, London, U.K.; CUMZ Cambridge University Museum of Zoology, Cambridge, U.K.; MH Mel Herbert's collection; PEB the author's collection; RMNH Leiden Natural History Museum, The Netherlands; SMSM the Sarawak Museum, Kuching, Sarawak, Malaysia.

### *Orthomeria* Kirby, 1904

*Orthomeria*, Kirby, 1904: 420; Bragg, 2001: 305; Zompro, 2004: 89. Type species: *Phasma* (*Ascephasma*) *forstenii* de Haan, 1842, by original designation.

### Diagnosis

Aschiphasmata: Aschiphasmata: Aschiphasmata. Head rounded, more or less globular; fore femora straight, not incurving at the base; femora without distinct carinae. Tegmina present, usually more or less circular but longitudinally folded so that they appear semicircular. Males and females very similar in coloration and general form, males are more slender and slightly shorter than females. Poculum generally quite deep when compared to other members of the tribe, often appearing similar to the female operculum. Eggs are laterally compressed spheres (lentic-shaped).

The genus *Orthomeria* currently contains nine species and, as previously noted (Bragg, 2001: 305), two of these: *alexis* (Westwood, 1859) and *cuprinus* Bragg, 2001, differ from the rest of the genus by being more slender and by having setose eggs. Previously I considered it unnecessary to create a new genus for these species (Bragg, 2001: 314); however, I now find a need to distinguish these species from the rest of the genus so propose placing these two,



and the new species described here, in a new subgenus.

The following key, which is based on the first couplet of my key to *Orthomeria* (Bragg, 2001: 305), serves to differentiate the two subgenera.

1. Mesonotum thickened, not or only slightly more than one-and-a-half times as long as wide.  
..... *Orthomeria (Orthomeria)* Kirby, 1904
- Mesonotum relatively slim, about twice as long as wide, or longer; legs green.  
..... *Orthomeria (Parorthomeria)* **new subgenus**

### ***Orthomeria (Orthomeria)* Kirby, 1904**

*Orthomeria*, Kirby, 1904: 420. Type species: *Phasma (Ascephasma) forstenii* de Haan, 1842, by original designation.

Diagnosis: Characteristics as for *Orthomeria* but restricted to those species with a mesonotum which is less, or only slightly more, than one-and-a-half times as long as wide, and with eggs that are not setose. In most species the body and legs are predominantly dark brown or black, they are rarely green. The wings are usually predominantly black or very dark, some species with lighter colours near the base.

This subgenus contains seven described species, and Dr Oliver Zompro (Kiel, Germany) has collected material from the Philippines that includes undescribed species which belong here.

### ***Orthomeria (Parorthomeria)* n. subgen.**

Type species *Aschipasma alexis* Westwood, 1859, by present designation.

Diagnosis: Characteristics as for *Orthomeria* but with the mesonotum of both sexes about twice as long as wide, or longer and with eggs which are setose. In all three known species the legs are green, with the apical third of fore femur black; body green or light brown (not black or dark brown), hind wings light coloured, either pale with darkened margins, or uniformly copper-coloured.

This subgenus contains three species: *O. (P.) alexis* (Westwood, 1859), *O. (P.) cuprinus* Bragg, 2001, and *O. (P.) turneri* **n.sp.**

**Etymology:** The name *Parorthomeria* is a previously unpublished name that was used by Klante on specimens of *Orthomeria cuprinus* in RMNH (Bragg, 2001: 314).

### **Key to *Parorthomeria***

1. Mesonotum just twice as long as wide; anal region of wings uniformly copper, costal region green or copper without any black.  
..... *Orthomeria (Parorthomeria) cuprinus* Bragg, 2001
- Mesonotum more than twice as long as wide; anal region of wings yellowish with dark margins, costal region green with brown or black longitudinal stripes. .... 2
2. Wings with wide dark band on the margin (fig. 1). Male 35-40mm, apex of poculum notched (fig. 3); female 46-53mm, apex of abdomen rounded (fig. 5).  
..... *Orthomeria (Parorthomeria) alexis* (Westwood, 1859)

- Wing with dark band on margin very narrow after about vein A<sub>7</sub> (fig. 2). Male 30mm, apex of poculum straight (fig. 4); female 37-44.5mm, apex of abdomen pointed (fig 7).  
..... *Orthomeria (Parorthomeria) turneri* **n.sp.**

***Orthomeria (Parorthomeria) alexis* (Westwood, 1859) (figs. 1, 3, 5, & 6.)**

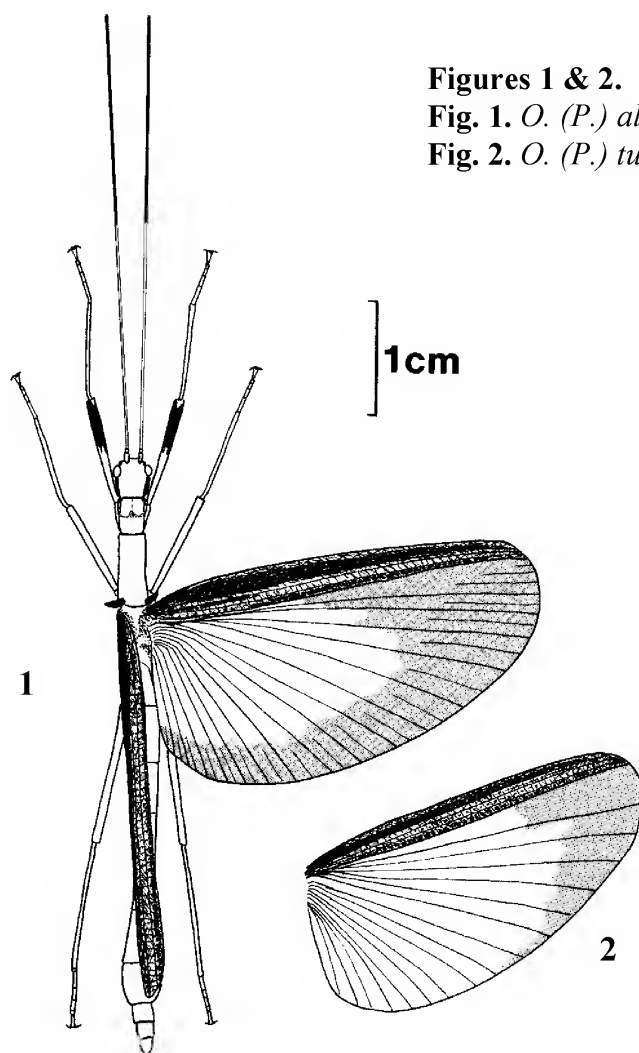
*Aschipsma alexis* Westwood, 1859: 94, pl. 28.3 (♀), 23a (♀), 23b (♂). Lectotype [selected here] ♂ (OXUM 503, 1/3) Sarawak. Wallace. Paralectotypes: 2♀♀ (OXUM 503 2/3, 3/3), Sarawak. Wallace; ♂, ♀ (BMNH, 56-44) Sarawak. Wallace; ♂ (BMNH, no data label).

*Orthomeria alexis* (Westwood); Kirby, 1904: 420; Günther, 1935a: 4; Bragg, 2001: 306, figs 110a (♀), 110c-f (egg), [not fig 110b – see *O. turneri*].

*Ascepasma alexis* Westwood; Redtenbacher, 1906: 77; Werner (1934b): 2.

*Presbistus marginatus*; Günther, 1943: 151 [not *P. marginatus* Redtenbacher] synonymised by Bragg, 2001: 306.

All six syntypes appear to be the same species but a lectotype selection was considered desirable because of the similarity to *O. (P.) turneri* **n.sp.** One BMNH specimen is unlabelled, however the method of preservation (style of setting, and piece of wood inserted in the abdomen) is consistent with the syntypes that have data labels.



***Orthomeria (Parorthomeria) cuprinus* Bragg, 2001**

*Orthomeria cuprinus* Bragg, 2001: 312, figs 112a (♂), 112b (♀), 112c-f (egg), plate 4c (♂). Holotype ♀ & eggs (PEB-2197) Sarawak, Tarum (nr Debak), collected mating with PEB-2198, P.E. Bragg, 25.x.1994. Paratypes: 16♀♀, 12♂♂ [for details see Bragg, 2001, and note below]

There was an error in the data listed for some of the paratypes in my own collection: on the second line of data for specimens from Sarawak “7♂♂ (PEB-2105-2109) 05.xi.1994” should read: 5♂♂ (PEB-2205-2209) 05.xi.1994.

Some of the type specimens from my own collection have subsequently been distributed to museums as follows:

To BMNH: Holotype ♀ (PEB-2197), Paratypes: ♂ (PEB-2198), ♂ (PEB-2209).

To OXUM: Paratypes: ♀ (PEB-2202), ♂ (PEB-2206).

To CUMZ: Paratype: ♀ (PEB-2204).

***Orthomeria (Parorthomeria) turneri* n.sp.**

*Orthomeria alexis*-variation; Bragg, 2001: 309, fig 110b.

**Material**

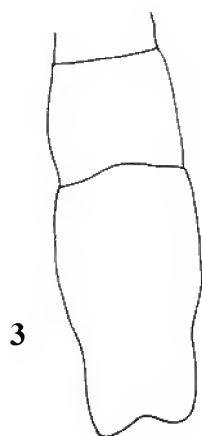
Holotype ♀ (CUMZ) SABAH, Danum Valley, Secondary forest. Sample 69S, Fogging. Ed Turner, 2002. Paratypes: ♂ (CUMZ) same data as holotype. ♀ (MH-15-1) BRUNEI, Sungai Mendaram, M. Herbert, v.1995. ♀ (PEB-2195) SARAWAK, near Betong on roadside vegetation, P.E. Bragg, 25.x.1994. ♀ (BMNH, 92-24) Baram, A. Everett, Oct. [18]91.

**Diagnosis**

Body and legs green, with black band down side of body. Wings yellowish with dark apex. Very similar to *O. alexis* in coloration and general appearance. Distinguished from *alexis* by smaller size (*alexis* ♂ 35-40mm, ♀ 46-53mm; *turneri* ♂ 30mm, ♀ 37-44.5mm), the darkened area of the wing not extending all around the margin, and usually by the presence of a longitudinal dark brown stripe along the centre of the pronotum and mesonotum (this has faded almost to invisibility on MH15-1). The apex of the male poculum is almost straight (not obviously notched), apex of anal segment with six teeth on the underside (3 on each side). The apex of the female's abdomen ends in a point (*alexis* is rounded).

**Table 1. *Orthomeria (Parorthomeria) turneri* n.sp. Measurements in mm.**

	♂	♀		♂	♀
Total length	30	c.37	Fore femur	5.7	6.6
Antennae	c. 20	c. 29	Fore tibia	5.2	6.0
Head	1.8	3.0	Fore tarsus	3.2	3.6
Pronotum	2.1	2.6	Mid femur	5.2	6.2
Mesonotum	3.6	4.5	Mid tibia	5.1	6.0
Metanotum	2.9	3.8	Mid tarsus	2.6	3.1
Median segment	2.0	2.5	Hind femur	7.3	9.3
Fore wing	0.7	1.2	Hind tibia	7.2	9.3
Hind wing	19.5	25.5	Hind tarsus	3.4	3.9

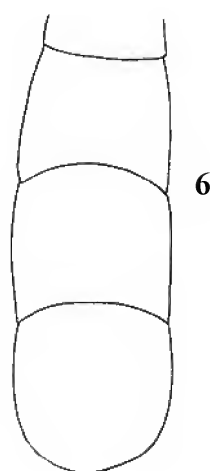
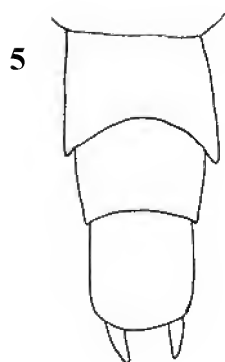


### Figures 3-4.

Poculum of males.

**Fig. 3.** *O. alexis*.

**Fig. 4.** *O. turneri*.



1mm

### Figures 5-8.

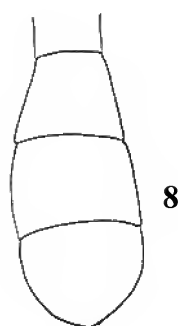
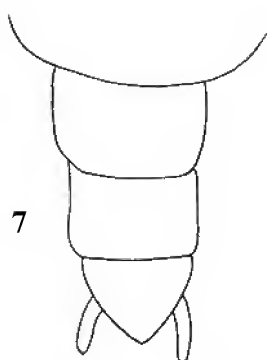
Dorsal view of abdomen.

**Fig. 5.** *O. alexis*, female.

**Fig. 6.** *O. alexis*, male.

**Fig. 7.** *O. turneri*, female.

**Fig. 8.** *O. turneri*, male.



### Female (figs. 2, 7, 10 & 11)

Holotype discoloured due to having been stored in alcohol. Parts which are green in the female paratypes are pale brown in the holotype; coloration described here is based on the paratypes and photographs of my paratype. Body and legs bright green in life, body brown when preserved. Dorsal surface of head and thorax pale brown. Ventral margins of pronotum, mesonotum, and metanotum with a broad black stripe that continues on the head. Posterior half of pronotum and anterior half of mesonotum with a narrow dark brown longitudinal stripe; the stripe may be very indistinct. Apical third of antennae black, basal two thirds pale brown. Dorsal surface of 7th abdominal segment white in life, brown when preserved. Abdominal terga 8-10, and all sternites, mid brown. Apical half of fore femora black. Tegmina black with a central broad longitudinal stripe. Anterior margin of costal region of wing with a broad green stripe, the

remainder appears to be brown, except in the paratype from Sarawak which has four longitudinal stripes, two green and two brown; many veins in the costal region are green (colorless in the holotype). Anal region of wing translucent golden-yellow with the apical third dark brown, the darkened area continues along the margin but is almost insignificant beyond about the seventh anal vein. Whole of body and legs densely, finely setose; head without setae. Body length: holotype 37mm (CUMZ); others: 38mm (MH15-1) and 44.5mm (PEB-2195); BMNH 42mm with apex of abdomen missing (it also has only 3 legs – both fore legs & left hind).

Head as long as wide, smooth, rounded (the holotype has an uneven depression on the top of the head that I believe to be the result of the original preservation method). Antennae with about 60 segments, third segment twice as long as adjacent segments. Pronotum one-and-a-third times longer than wide, anterior half slightly swollen and with a longitudinal groove; pronotal foramen opens dorsally on the anterior margin. Mesonotum widening only slightly; just over twice as long as width of anterior margin (2x width of posterior margin). Metanotum longer than median segment. Metanotum and median segment and wider than mesonotum. Abdominal segment 2 narrowing, 3-4 of uniform width, 5-7 swollen laterally and ventrally, 8-10 short and narrowing, 10th with pointed apex. Lamina supraanalis not visible dorsally. Cerci tapering, straight, projecting beyond abdomen. Operculum moderately deep, apex rounded.

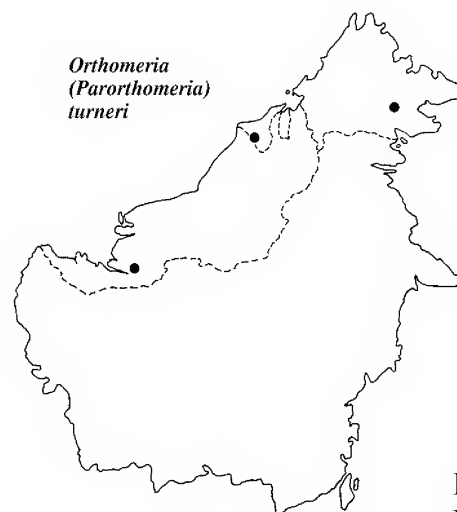
Hind legs reaching to the end of the abdomen. Femora only slightly longer than tibiae. Femora without dorsal carinae, ventral carinae unarmed. Tibiae rounded, without carinae. Tarsomeres 1-4 decreasing in length evenly.

Tegmina as wide as long, almost circular, but folded longitudinally. Wings deep and reaching to end of 7th segment.

#### **Male** (figs. 4, 8, & 10)

Coloration as in female holotype, (except 7th segment presumably not white). Body length 30mm.

Description as in female except for the following. Pronotum 1.2x longer than wide. Mesonotum 2.5x longer than width of anterior margin (about 2x width of posterior margin). Abdominal segments 2-7 narrowing slightly, 8<sup>th</sup> widening slightly, 8-10 short. Apex of 10th segment rounded; the ventral surface with three small spines on each side. Cerci projecting below and curving round the poculum; long, tapering, inward curving. Poculum long, slightly upcurving, apex down-turned and not quite symmetrical.



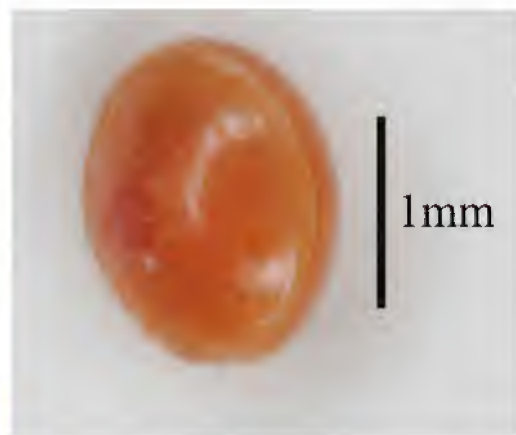
**Figure 9.** *O. (P.) turneri*.  
Distribution in Borneo.



**Figure 10.** *Orthomeria (Parorthomeria) turneri* n.sp.: a) Female MH-15-1; b) Female PEB-2195; c) Female holotype CUMZ; d) Male CUMZ.



**Figure 11.** *O. (P.) turneri* n.sp. - female PEB-2195.



**Figure 12.** *O. (P.) turneri* n.sp.  
Egg, lateral view.

**Egg** (fig. 12)

Six eggs were removed from the body of the female from Danum; two were underdeveloped or badly damaged. The eggs are setose, lentil-shaped; measurements (to nearest 0.05mm): length 1.60mm, height 1.25mm width 0.80mm. These are the smallest known phasmid eggs. A single egg was removed from the operculum of the largest paratype, this measured: length 1.75mm, height 1.50mm, width 0.90mm.

**Etymology:** This species is named after the collector of the Danum material, Dr. Ed Turner.

**Comments**

The holotype is not the best specimen, having lost its original colour and a leg, and a second leg is glued to card rather than attached to the body, and the head has a depressed area resulting from being preserved in alcohol. However, the holotype can be reliably associated with the male and I decided a poor quality pair is preferable to a holotype with no other geographically associated specimen. A female was chosen as the holotype because the distinction between *turneri* and *alexis* is clearer in the females.

The data on the BMNH specimen is handwritten in pencil and the collector's name is unclear; the date "Oct 91" clearly refers to October 1891, the BMNH accession number 92-24 is for 1892. The batch included four phasmids purchased from Mr E Gerard, and collected by Mr A Everett. The vague locality, Baram [river], is omitted from the distribution map (fig. 9).

Measurements for *alexis* that I gave in *Phasmids of Borneo* are from my own material and *Die Insektenfamilie der Phasmiden* (Redtenbacher, 1906) only, it is therefore possible that there is an overlap in the size of *alexis* and *turneri*. The wing patterns of most of the 153 specimens of *alexis* that I recorded (Bragg, 2001: 306-308) were examined, however, some in the collections of C.L. Chan and the Sarawak Museum (SMSM) do not have their wings open and re-examination of these to check the identity would be desirable.

**Acknowledgements**

Thanks to Judith Marshall (BMNH) and Jon Martin (BMNH) for tracing the information on the BMNH paratype, to Oliver Zompro for comments on the manuscript, and to Ed Turner (CUMZ) for the loan of material.

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**Postscript on Aschiphasmata in *Phasmids of Borneo***

The table of measurements for *Orthomeria* spp. in *Phasmids of Borneo* (Bragg, 2001: 304, table 29) has the column headings out of alignment, as does table 32 on page 346. Some of the data was omitted for the holotype of *Dajaca viridipennis* Bragg, 2001 (p. 353), the full data is as follows: Holotype ♂ (PEB-2196) Sarawak, Tarum (near Debak), P.E. Bragg, 25.x.1994.

# Reviews and Abstracts.

## Phasmid Abstracts

The following abstracts briefly summarise articles that have recently appeared in other publications. Some of these may be available from local libraries. Others will be available in university or college libraries, many of these libraries allow non-members to use their facilities for reference purposes free of charge.

The editor of *Phasmid Studies* would welcome recent abstracts from authors so that they may be included in forthcoming issues. In the case of publications specialising in phasmids, such as *Phasma*, only the longer papers are summarised.

**Blüthgen, N., Metzner, A. & Ruf, D.** (2006) Food plant selection by stick insects (Phasmida) in a Bornean rain forest. *Journal of Tropical Ecology*, **22**: 35-40.

Stick insects (Phasmida) are important herbivores in tropical ecosystems, but have been poorly investigated in their natural environment. We studied phasmids and their food plants in a tropical lowland rain forest in Borneo (Danum Valley, Sabah, Malaysia). Thirty species of phasmid were collected from 49 plant species during nocturnal surveys in the forest understorey. In most cases (35 plant species), experiments confirmed that these phasmids fed on those plant species from which they were collected. Partitioning of phasmid species among food plant species was highly significant. Two common species had a largely restricted diet: *Asceles margaritatus* occurred mainly on *Mallotus* spp. (Euphorbiaceae) and *Dinophasma ruficornis* on *Leea indica* (Leeaceae). Other phasmids fed on a broad spectrum of plant families and can be considered polyphagous (e.g. *Haaniella echinata*, *Lonchodes hosei herberti*). Feeding experiments were performed on captive phasmids using leaves from eight plant species. *Asceles margaritatus* showed a significantly higher consumption rate for *Mallotus miquelianus* leaves than for other plants, while *H. echinata* showed the opposite trend and the lowest consumption for *M. miquelianus*. However, *A. margaritatus* readily accepted foliage from several plant families, particularly when *Mallotus* was not offered at the same time. Therefore, studies on host specialisation by herbivores need to include their distribution in the natural vegetation.

**Bragg, P.E.** (2006) Nieuw: *Lonchodes bushelli*. *Phasma*, **16**(61): 10-12. [in Dutch]

Illustrations and description of a new *Lonchodes* species found by Mark Bushell and Phil Bragg in August 2001. A colour photograph of the male appears on page 14.

**Bresseel, J.** (2005) Kweekbeschrijving *Spiniphasma crassithorax* (Zompro, 2001). *Phasma*, **15**(59): 7-8 & 20. [in Dutch].

*Spiniphasma crassithorax* is a small and spiny species from Cambodia. They are easy to rear in captivity as they accept bramble, Hypericum, etc. The article includes one black-and-white photo, with a colour photo on page 20.

**Bresseel, J.** (2006) De verschillende *Pseudophasma* (Kirby, 1896) en *Malacomorpha* (Rehn, 1906) soorten in cultuur. *Phasma*, **16**(61): 8-9. [in Dutch].

Following the *Phasma* meeting of 26<sup>th</sup> April with an exhibition of *Pseudophasma* and *Malacomorpha*, the author describes the several species that are in culture at the moment with a key to the differences between the seven species. Two colour photographs appear on page 14.

**Brock, P.D. & Delfosse, E.** (2005) A list of Pantel's phasmid type material in the Muséum National D'Histoire Naturelle, Paris (Phasmida). *Revue française d'Entomologie* (N.S.), **27**(2): 49-56.

Lists 44 species of phasmids in the collection of Pantel at Paris Museum. Two new synonyms are given: *Necroscia illaesa* Redtenbacher, 1908 is a junior synonym of *Trachythorax maculicollis* (Westwood, 1859) and *Carausius jesuitae* Brunner, 1907 is a junior synonym of *Carausius sechellensis* (Bolivar, 1895).



**Cliquennois, N.** (2006) Révision partielle des Antongiliinae fondée sur l'étude des œufs, comprenant la définition d'une nouvelle tribu et de quatre nouveaux genres (Phasmatodea). *Bulletin de la Société entomologique de France*, **111** (1): 157-172. [in French].

Partial review of Antongiliinae based on the study of eggs, including the definition of a new tribe and four new genera (Phasmatodea). Based on a study of their eggs, some species of the Malagasy subfamily Antongiliinae are shared between the genera *Antongilia* Redtenbacher, 1906, *Onogastris* Redtenbacher, 1906, *Paracirsia* n. gen. (type species : *Pachymorpha distincta* Brunner, 1907), *Paronogastris* n. gen. (type species : *Antongilia squamigera* Redtenbacher, 1906), *Pseudonogastris* n. gen. (type species : *Antongilia aculeate* Redtenbacher, 1906) and *Virgasia* n. gen. (type species : *Antongilia simplex* Redtenbacher, 1906). The new tribe Leprodini is proposed to contain the genera *Leprodes* Redtenbacher, 1906, *Pseudonogastris* and *Virgasia* which show a kind of egg very different to the one of the tribe Antongiliini in which the species belonging to these three genera were placed until now.

**Conle, O.V.** (2006) *Hennobrimus hennemanni* n.gen. n.sp., a remarkable new genus and species of the tribe Obrimini from the Philippine Islands. (Phasmatodea: Heteropterygidae: Obriminae: Obrimini). *Zootaxa*, **1231**: 43–51.

A new genus and species (*Hennobrimus hennemanni* n.gen. n.sp.) of the tribe Obrimini from the Philippine Islands of Mindanao and Leyte are described and illustrated from both sexes. The holotype is preserved in the State Zoological Collections Munich, Germany (ZSMC). Paratypes are deposited in the private collection of the author and in the private collection of Frank H. Hennemann (Kaiserslautern, Germany).

**Conle, O.V. & Hennemann, F.H.** (2005) Studies on Neotropical Phasmatodea I: A remarkable new species of *Peruphasma* Conle & Hennemann, 2002 from northern Peru (Phasmatodea: Pseudophasmatidae: Pseudophasmatinae). *Zootaxa*, **1068**: 59-68.

*Peruphasma schultei* n. sp., a remarkable new phasmid from the Cordillera del Condor in Northern Peru, is described and illustrated from both sexes and the eggs. It is the first species of *Peruphasma* Conle & Hennemann, 2002 known to have rudimentary tegmina and alae. The original specimens were collected by Dipl. Biol. Rainer Schulte (INIBICO NGO, Tarapoto, Peru) to whom it is dedicated. Brief information on its biology and breeding are provided as well. *Peruphasma picturata* (Redtenbacher, 1906) is re-transferred to *Autolyca* Stål, 1875 and the type-locality "Chile" is shown to be wrong.

**Conle, O. & Hennemann, F.** (2005) Kweekbeschrijving *Peruphasma schultei* Conle & Hennemann, 2005, een opmerkelijk mooie wandelende tak van Cordillera des Condor in Noord Peru. *Phasma*, **15**(59): 5-6 & 20. [in Dutch].

The recently imported *Peruphasma schultei* was described by Oskar Conle and Frank Hennemann in October 2005. The natural habitat of this new species is apparently rich of endemism and was therefore declared a National Park by INIBICO NGO, a large nature protection association in cooperation with the Peruvian government. The article includes two black-and-white photos and on page 20 there are two colour photographs.

**Hennemann, F. & Conle, O.** (2005) *Pseudophasma velutinum* (Redtenbacher, 1906), een nieuwe Pseudophasmatinae uit Peru. *Phasma*, **15**(58): 5-7 & 11. [in Dutch].

*Pseudophasma velutinum* (Redtenbacher, 1906) from Peru is rather small representative of the well-known genus *Pseudophasma* Kirby, 1896. Many adult specimens were collected by the authors in Peru (Panguana) and the species has since been successfully reproduced in captivity in Europe. Short descriptions of the adults, nymphs and eggs as well as information on its identity, biology, breeding and alternative foodplants are provided.

**Hennemann, F.H. & Conle, O.V.** (2006) A new species of *Trachyaretaon* Rehn & Rehn, 1939 from the Babuyan Islands, Philippines (Phasmatodea: Heteropterygidae, Obriminae, Obrimini). *Entomofauna*, **27**(18): 217-228.

*Trachyaretaon brueckneri* n.sp. from the Babuyan Islands (Northern Philippines), a new species of the genus *Trachyaretaon* Rehn & Rehn, 1939 is described and illustrated from both sexes and the eggs. For comparison, illustrations of the type-species *T. echinatus* (Stål, 1877) are provided. Keys are provided to distinguish the taxa of *Trachyaretaon* Rehn & Rehn, 1939. The holotype is preserved in the State Zoological Collections Munich (ZSMC), paratypes are deposited in various public and private collections.

**Hennemann, F. & Conle, O.** (2006) Studies on New Guinean giant stick-insects of the tribe Stephanacridini Günther, 1953, with the descriptions of a new genus and three new species of *Stephanacris* Redtenbacher, 1908 (Phasmatodea: "Anareolatae"). *Zootaxa*, **1283**: 1–24

The genus *Hermarchus* STÅL, 1875 (type-species: *Phibalosoma pythonius* Westwood, 1859) is an artificial taxon. The new genus *Macrophasma* n.gen. (type-species: *Hermarchus biroi* Redtenbacher, 1908) is described to contain all New Guinean species currently in *Hermarchus* Stål, as these differ considerably from the type-species of *Hermarchus* Stål from Fiji by various features of the insects and eggs. *Hermarchus biroi* Redtenbacher, 1908, *H. lyratus* Redtenbacher, 1908 and *H. oreitrephe* Günther, 1929 are transferred to *Macrophasma* n.gen.. *Hermarchus annulatus* Günther, 1929 and *H. muelleri* Redtenbacher, 1908 are shown to be synonyms of *H. biroi* Redtenbacher, 1908 (n.syn.). A lectotype is designated for *M. biroi* (Redtenbacher, 1908) with the egg described and illustrated. Three new species of the genus *Stephanacris* Redtenbacher, 1908 from New Guinea are described and illustrated from the females and eggs: *Stephanacris draconius* n.sp. from Papua New Guinea, *Stephanacris multilobatus* n.sp. from southeast West Papua and *Stephanacris laeviceps* n.sp. from northwest West Papua. Holotypes are deposited in ZSMC and RMNH, paratypes in the first and second author's collections.

**Jansen, E.** (2006) Planten uit de Anacardiaceae-familie als voedselplant. *Phasma*, **16**(60): 8-9. [in Dutch].

Bramble is, and always will be, the main food source for our phasmids but, as more and more new cultures are found, new food sources are needed. The plant family Anacardiaceae is well represented in the tropics and subtropics with about 1000 species. This article describes the genera of Anacardiaceae which grow in colder areas and, although not evergreen, can be a good foodplant for several phasmid species.

**Simoens, R. & Rabaey, K.** (2006) *Abrosoma johorensis* Seow-Choen & Goh, 1999 PSG 265. *Phasma*, **16**(60): 5-7. [in Dutch].

In February 2005 Ian and Maureen Bushell had a holiday at Bukit Pelindung, Kuantan, Peninsular Malaysia. They collected *Abrosoma johorensis*. The authors received eggs from the four adult pairs that were found and they are now well established in culture. This article gives a brief description of the species and reports their remarkable defensive behaviour. Two colour photographs of this species appear on page 13.

**Simoens, R. & Rabaey, K.** (2006) *Dyme mamillata* Brunner v. Wattenwyl, 1907 uit Peru (Panguana). *Phasma*, **16**(61): 5-7. [in Dutch].

*Dyme mamillata* is a newly cultured species from Peru (Panguana). It is typical for the genus *Dyme* but characterised by the spines on the thorax of females, and orange and red granules along the sides of the thorax of males. Information is provided on the classification, culture history and origin of the present culture-stock, breeding and alternative foodplants. Brief descriptions and illustrations are provided of the adults and eggs. Two colour photographs of this species appear on page 14.

**Zompro, O.** (2005) Catalogue of type-material of the insect order Phasmatodea, housed in the Museum für Naturkund der Humboldt-Universität zu Berlin, Germany and in the Institut für Zoologie der Martin-Luther-Universität in Halle (Saale), Germany. *Mitt. Mus. Nat.kd. Berl., Dtsch. entomol. Z.*, (2005)2: 251-290.

A catalogue of the type-material of the insect order Phasmatodea housed in the Museum für Naturkunde der Humboldt-Universität, Berlin, Germany, and in the collection of the Institut für Zoologie der Martin-Luther-Universität in Halle (Saale), Germany is published. The collection in Berlin contains types of more than 280 species and is especially strong in material of New Guinea, described by Bragg, Brunner v. Wattenwyl, Charpentier, Fritzsche, Gerstäcker, Günther, Hennemann, Karsch, Pictet, Redtenbacher, Rehn, Schaum, Sjöstedt, Westwood and Zompro. The catalogue includes the specimens from Baltic amber described by Pictet & Berendt (1854), housed in the Palaeontological Institute of the museum. The collection in Halle contains types of eight species, which are all described by Burmeister.

A lectotype is designated for *Cuniculina obnoxia* Brunner v. W, 1907.

New synonyms are: *Cuniculina modesta* Brunner v. W, 1907, of *Clitumnus lobipes* Brunner v. W, 1907, and *Parapachymorpha quadrispinosa* Hennemann, Gehler & Conle, 1995 of *Clitumnus spiniger* Brunner v. W, 1907.

Two new African genera and species of Phasmatodea: Bacillidae: Antongilliinae, *Ulugurucharax uluguruensis* n.gen. n.sp. and *Tuberculatocharax fritzsicki* n.gen. n.sp. are described for the first time. *Tuberculatocharax* n.gen. is the only genus of Tuberculatocharacini n. trib., which is characterized by the reduction of the profemoral area apicalis. Beside two genera of Bacillini (Bacilloidea: Bacillidae), this is the only case known in Phasmatodea.

**Zompro, O.** (2005) Inter- and intra-ordinal relationships of the Mantophasmatodea, with comments on the phylogeny of polyneopteran orders (Insecta: Polyneoptera). *Mitt. Geol.-Paläont. Inst. Univ. Hamburg*, **89**: 85-116.

Intra-ordinal relationships of the Mantophasmatodea are reviewed, with the groundplan developed. Interordinal relationships within the Polyneoptera are discussed. Egg structure is considered for the first time. The new results differ considerably from the previous arrangements. The families established by Klass *et al.* (2003) are synonymised for the first time with the tribe Mantophasmatini (Austrophasmatidae) and the genus *Mantophasma* (Tanzaniophasmatidae). †*Adicophasma spinosa* Engel & Grimaldi, 2004, established for a single nymph from Baltic amber, is synonymised with †*Raptophasma kerneggeri* Zompro, 2001. Four new species are described from Baltic amber: †*Electrotimema carstengroehni* n. gen. n. sp. (Timematodea); †*Dvergrphasma fafnir* n. gen. n. sp. (Phasmatodea); †*Ensiferophasma velociraptor* n. fam. n. gen. n. sp. (Mantophasmatodea); †*Mantoida matthiasglinki* n. gen. n. sp., and a Recent one, *Zorotypus sechellensis* n. sp. (Zoraptera).

**Zompro, O.** (2006) Katalog des typen-Materials der Insektenordnung Phasmatodea im Staatlichen Museum für Naturkunde in Stuttgart. *Arthropoda*, (2)**13**(4): 2-15.

The type material of the insect order Phasmatodea deposited in the Staatliches Museum für Naturkunde in Stuttgart, Germany (SMNS) is listed. All species are figured. Errors in the previous catalogues of Hennemann, Gehler & Conle (1995) and Hennemann & Conle (2003) are corrected. A new synonym has been traced: *Ocnophila strumosa* Brunner v. Wattenwyl, 1907 a synonym of *Ocnophila ornatissima* Brunner v. Wattenwyl, 1907.

**Zompro, O. , Adis, J. & Berti-Filho, E.** (2006) The first Australian record of a species of *Echethus* originally described from Brazil (Phasmatodea: Verophasmatodea: "Anareolatae"). *Studies on Neotropical Fauna and Environment*, **41**(2): 131-132.

Two species of the Australian genus *Echethus* Stål, 1875 have been reported from Brazil, one of them being destructive to *Eucalyptus* plantations. Both species were supposed to have been introduced from Australia. Now the first specimen from Australia of one of these, *E. evoneobertii* Zompro & Adis, 2001, has been traced in a German museum.

**Zompro, O. & Domenico, F.C. de** (2005) Catalogue of type material of Phasmatodea (Insecta) deposited in Brazilian Museums. *Iheringia, Sér. Zool., Porto Alegre*, **95**(3): 255-259.

The type material of Phasmatodea deposited in Brazilian museums and institutions is listed for the first time. New synonyms are proposed: *Phibalosoma paulense* Toledo Piza, 1938, *Phibalosoma rochai* Toledo Piza, 1938, *Bacteria tuberculata* Toledo Piza, 1938 and *Bacteria tuberculata* var. *argentina* Toledo Piza, 1938 are junior synonyms of *Cladomorphus phyllinus* (Gray, 1835). Nineteen new combinations are established.